

Outbreak Alert!

Trends in Foodborne Illness Outbreaks in the United States (1990 – 2005)

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CSPI and IACFO

- The Center for Science in the Public Interest is a bi-national NGO representing consumers in both the US and Canada
- Safe Food International partners with consumer organizations in other regions of the world on food safety issues
- The International Association of Consumer Organizations provides representation in Codex for consumer organizations on five continents



Estimating Food Borne Disease: The Starting Point

- The CDC estimates that foodborne diseases affect 76 million Americans annually
- An estimated 5,000 Americans die from foodborne diseases and another 325,000 people are hospitalized each year
- The worst cases of foodborne illness occur in the most vulnerable: the old, the young, and those with weakened immune systems



Foodborne Disease Surveillance & Investigation in the U.S.

- ❖ FoodNet – active surveillance
- ❖ PulseNet – laboratory network that performs microbial sub-typing
- ❖ *Outbreak Alert!* – food attribution



Foodborne Diseases Active Surveillance Network (FoodNet)

- ❖ Active, laboratory-based surveillance within 10 well-defined surveillance areas around the United States
- ❖ Monitor trends in foodborne diseases
- ❖ Conduct case-control studies



FoodNet (*cont.*)

FoodNet Pathogens

Campylobacter

Cyclospora

Cryptosporidium

Escherichia coli O157:H7

Listeria monocytogenes

Salmonella

Shigella

Vibrio

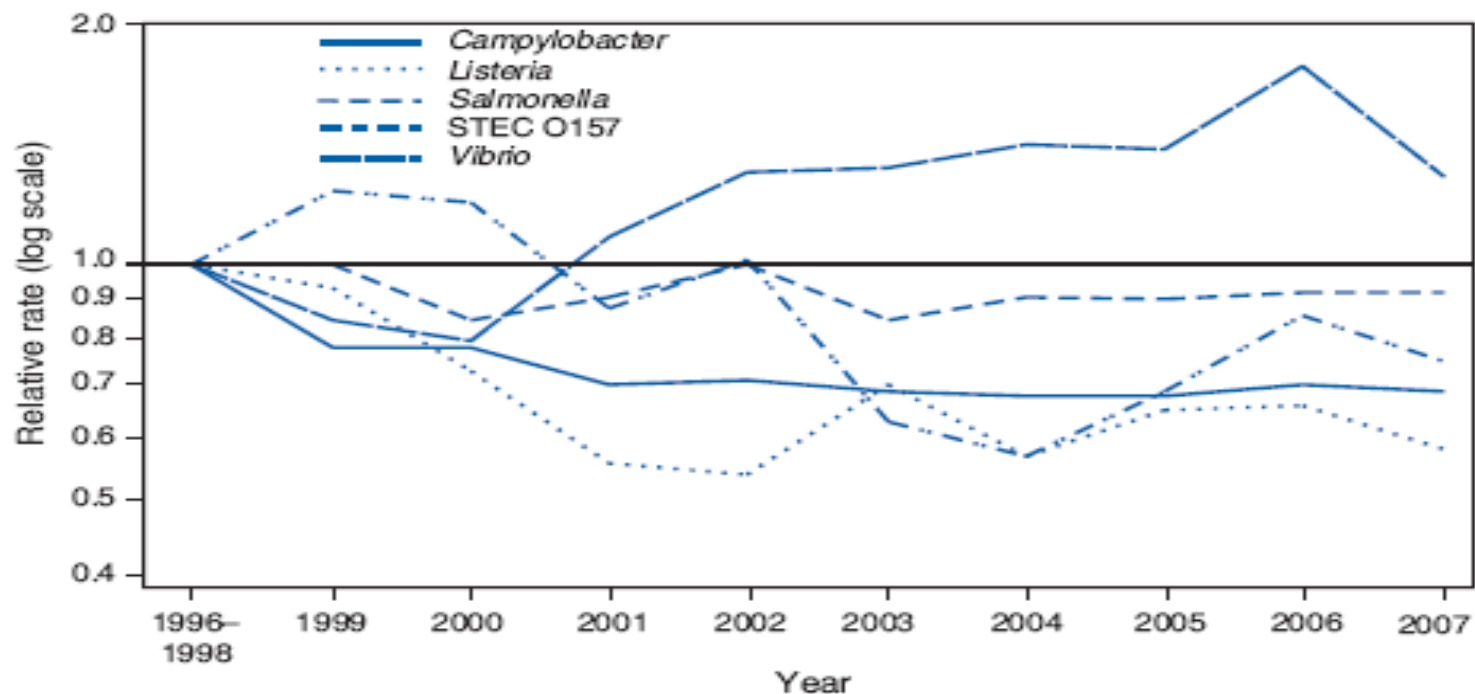
Yersinia enterocolitica

- ❖ Approximately 17,000 laboratory-diagnosed cases, each year
- ❖ Data collected includes patient demographics, co-morbidities, hospital stay details, and laboratory results



Foodborne Illness Trends from CDC

FIGURE 2. Relative rates of laboratory-confirmed infections with *Campylobacter*, STEC* O157, *Listeria*, *Salmonella*, and *Vibrio* compared with 1996–1998 rates, by year — Foodborne Diseases Active Surveillance Network, United States, 1996–2007†



* Shiga toxin-producing *Escherichia coli*.

† The position of each line indicates the relative change in the incidence of that pathogen compared with 1996–1998. The actual incidences of these infections can differ.

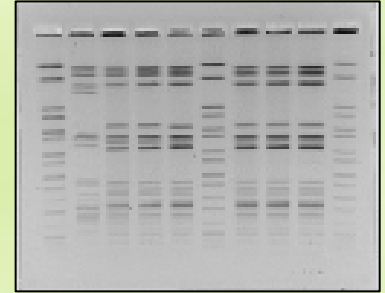


PulseNet USA

- ❖ National database of pulsed-field gel electrophoresis (PFGE) patterns
- ❖ Enables outbreak cases and concurrent sporadic cases to be distinguished
- ❖ Does not include routine PFGE patterns from food and animal sources



What is PFGE?



- ❖ DNA “fingerprinting”
- ❖ A method used to differentiate specific strains of bacteria using DNA migration by size in an agarose gel stimulated by an electrical current
- ❖ More sensitive and discriminating than conventional gel electrophoresis because the electrical field used to stimulate DNA migration is pulsed (constantly changing) rather than uniform



PulseNet USA (*cont.*)

PulseNet Pathogens

Campylobacter jejuni

Cyclospora

Cryptosporidium

Escherichia coli O157:H7

Listeria monocytogenes

Salmonella

Shigella

Vibrio

Yersinia enterocolitica

- ❖ The PulseNet database includes tens of thousands of PFGE patterns
- ❖ Labs at the national, state, and local levels have access to the database



History of Outbreak Alert!

- CSPI started collecting data on food borne illness (FBI) outbreaks in 1997 and organizing it by regulatory agency (USDA and FDA).
- The data was not readily available from CDC; however, with our continued requests, CDC started posting a yearly line listing on the internet.
- In 1999, we published the first line listing of FBI outbreaks organized by food category and by regulatory agency.



Outbreak Alert!

Food Categories

Beef

Beverages

Breads & Bakery

Dairy

Eggs & Egg Dishes

Game

Luncheon/Other Meats

Multi-Ingredient Foods

Multiple Foods

Pork

Poultry

Produce

Seafood

- ❖ Outbreaks are grouped by food vehicle, and placed in one of 13 food categories
- ❖ It is a unique database of outbreaks linked to specific foods, as well as specific pathogens
- ❖ A project managed and maintained by a private, non-profit, consumer advocacy group



Unique Data

- CSPI database contains over 5400 outbreaks, with both known food source and etiology, which occurred in the U.S. between 1990-2005
- Outbreak data was compiled from several different sources including the CDC, state and local health departments, and scientific journals



Outbreak Alert!

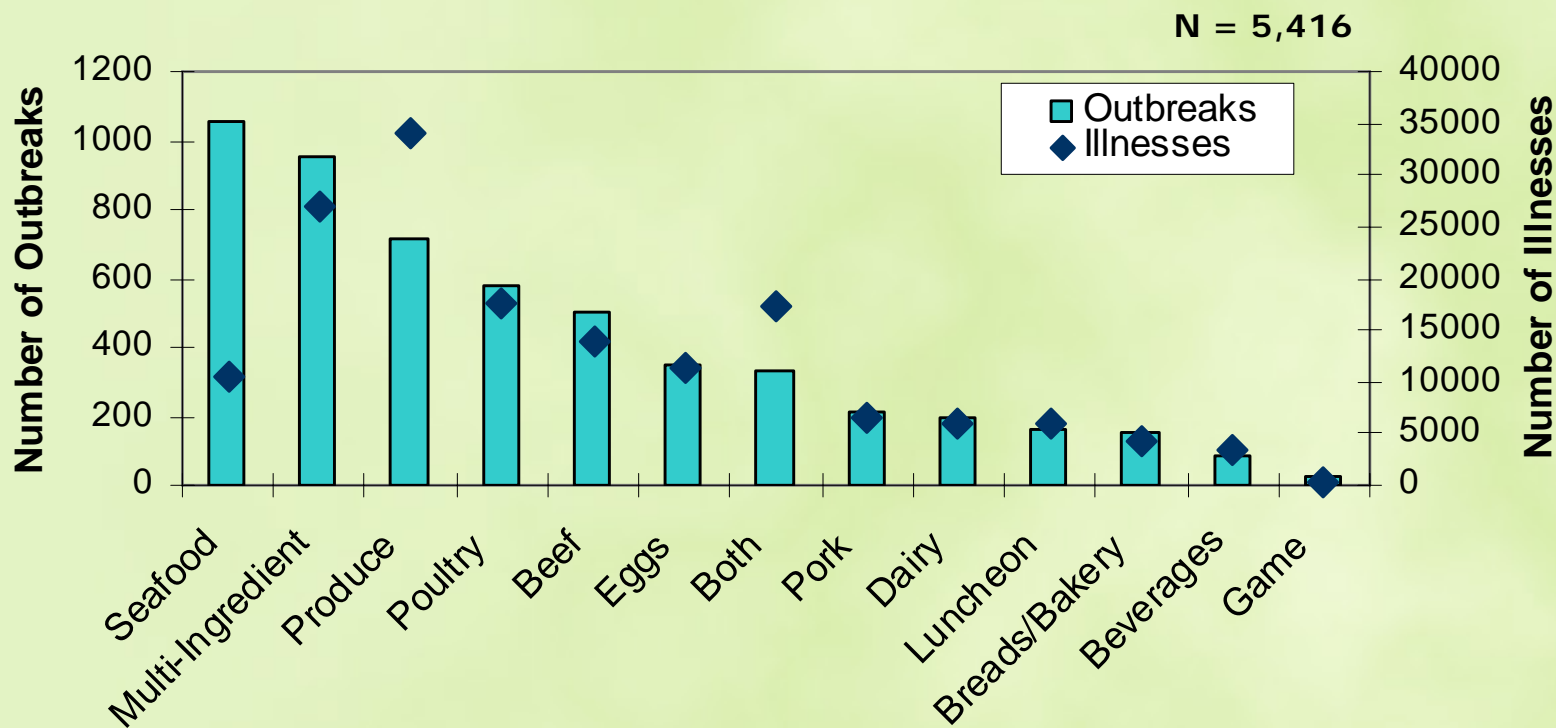
OUTBRK05 : Form

ID:	<input type="text" value="1"/>	Cases:	<input type="text" value="12"/>
Mth:	<input type="text" value="12"/>	States:	<input type="text" value="OH"/>
Year:	<input type="text" value="1990"/>	Initial Date:	<input type="text" value="12/1/1990"/>
Category:	<input type="text" value="Breads and Bakery"/>	Reference:	<input type="text" value="1"/>
Food:	<input type="text" value="Bakery"/>	Location:	<input type="text" value="Institution"/>
Agency:	<input type="text" value="FDA"/>	Comments:	<input type="text"/>
Final Date:	<input type="text"/>	Date Entered:	<input type="text" value="2002"/> Initials: <input type="text"/>
Vehicle:	<input type="text" value="Chocolate cake with icing"/>		
Cause:	<input type="text" value="Bacillus"/>		
Etiology:	<input type="text" value="B. cereus"/>		

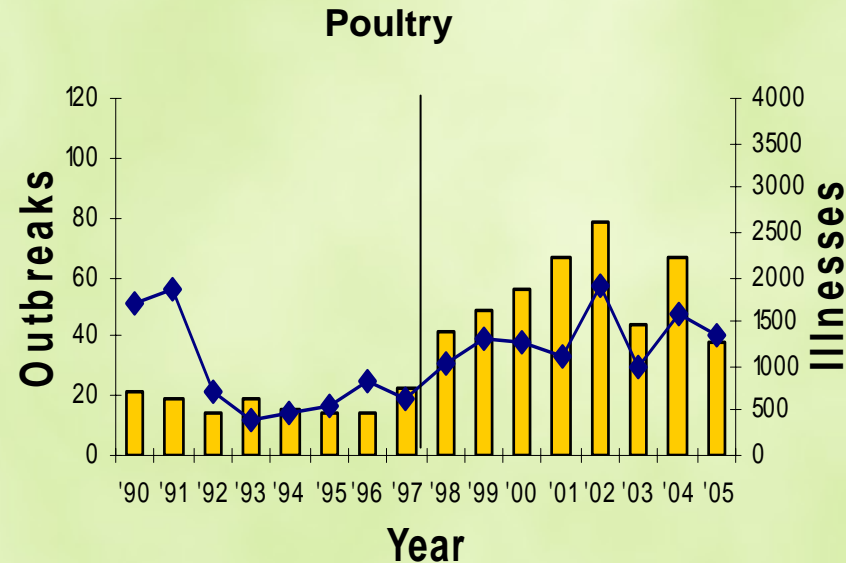
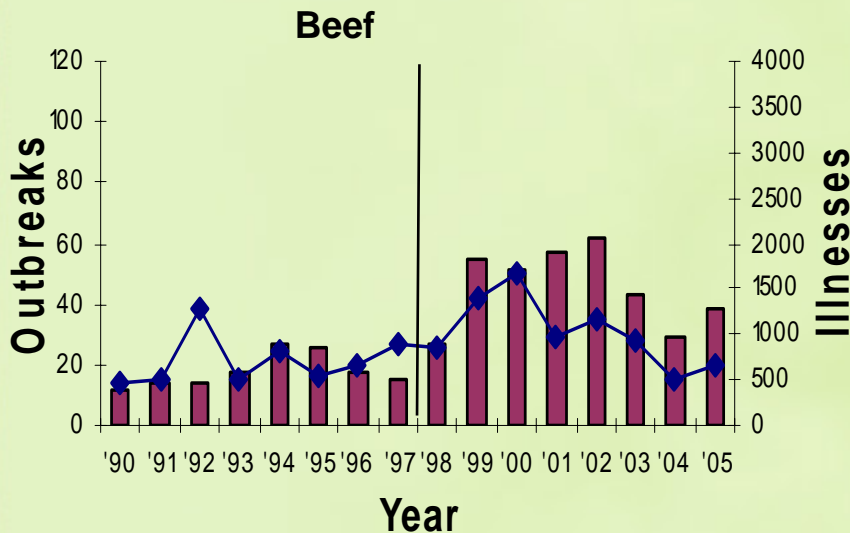
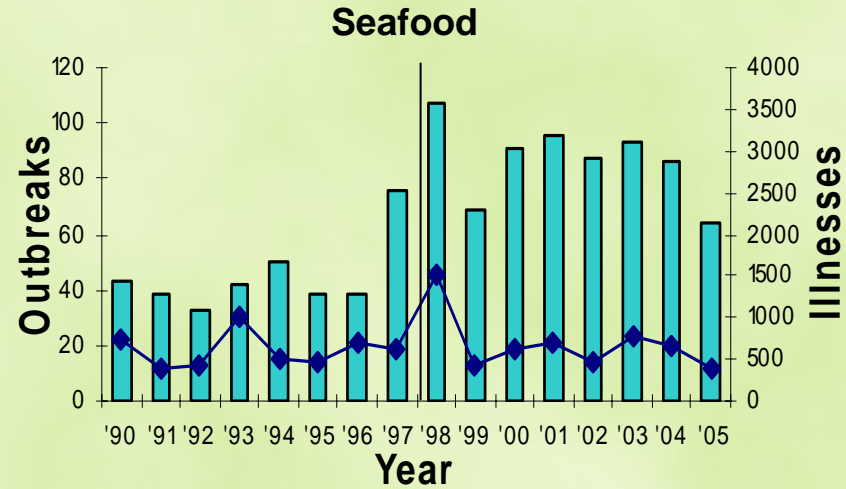
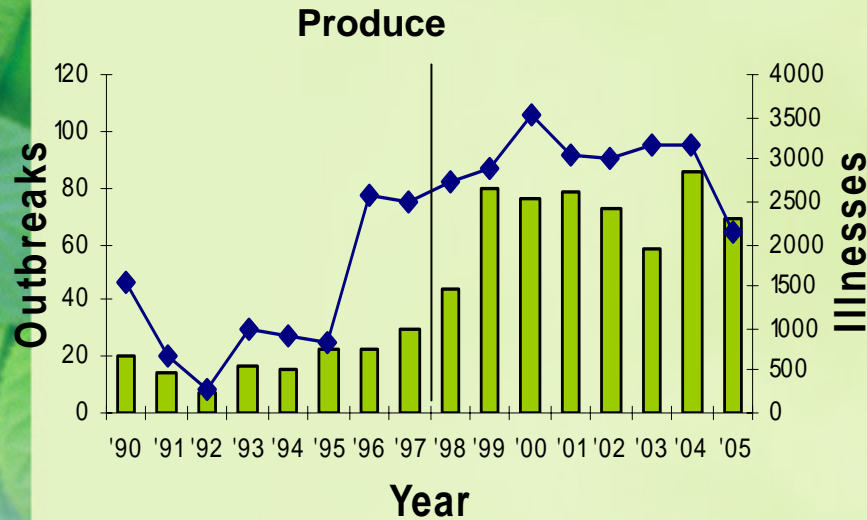
Record: of 4486



Number of Outbreaks By Food, 1990-2005



Outbreak Trends of Major Food Categories



Note: In 1998, CDC began enhanced surveillance efforts to increase FBI reporting.

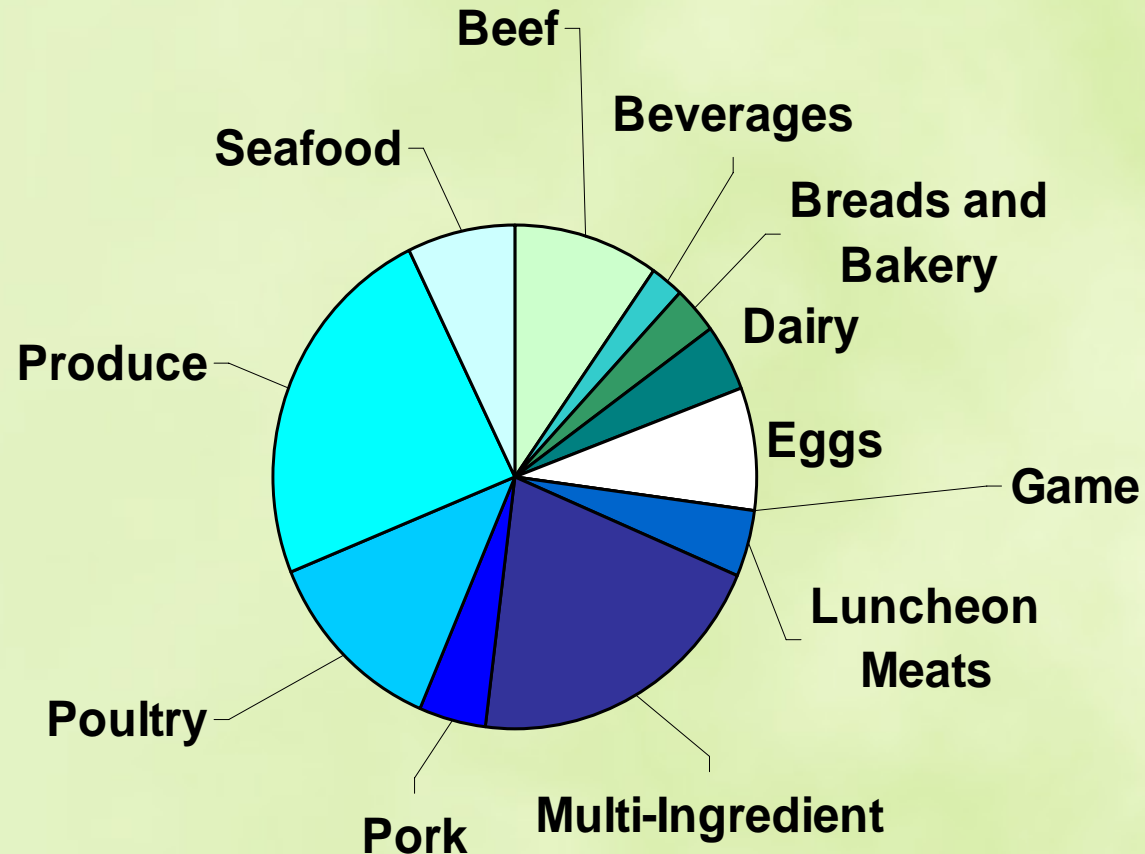


Database Applications

- Outbreak data with food attribution is critical to conduct a food/hazard assessment for HACCP
- Assesses food types most often linked to foodborne illness outbreaks by location
- Assesses pathogens causing outbreaks by location and food type



Outbreaks by Vehicle, 1990-2005

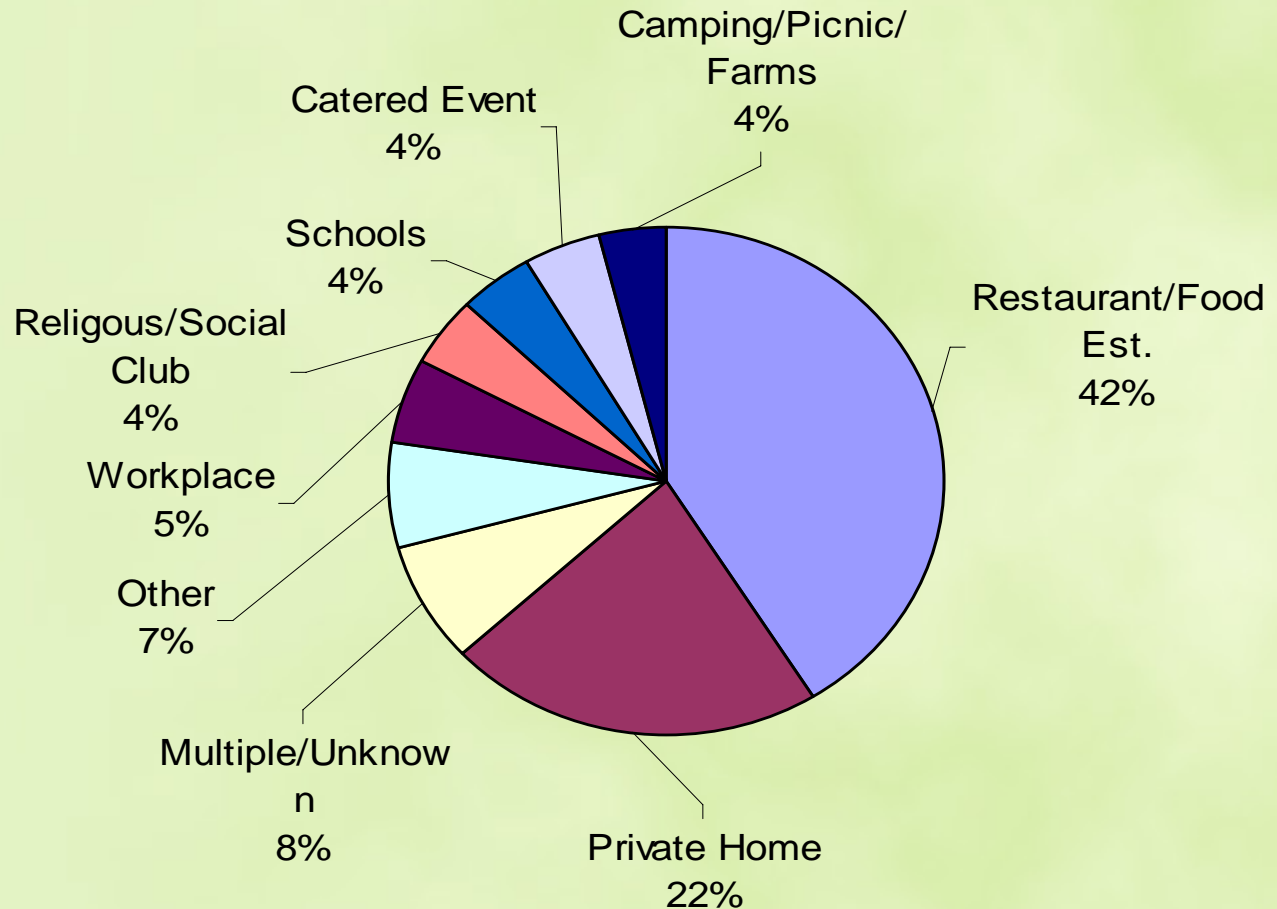


Source: *Outbreak Alert!* Center for Science in the Public Interest, 2006



Locations of Foodborne Illness Outbreaks

Outbreak Location 1990-2005

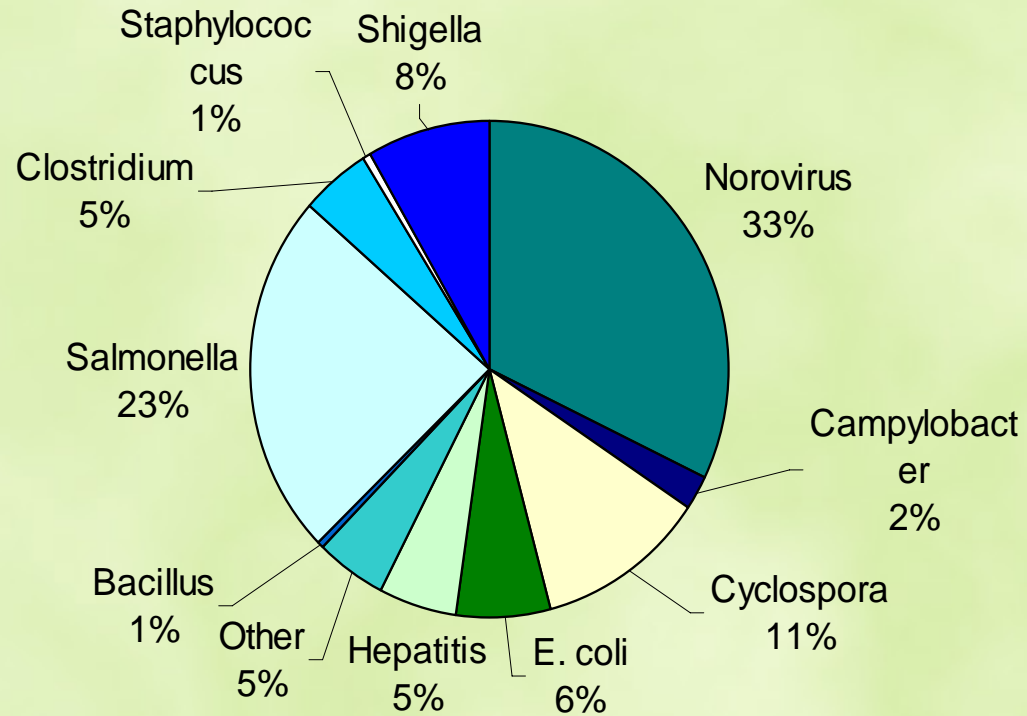


Source: *Outbreak Alert!* Center for Science in the Public Interest, 2006

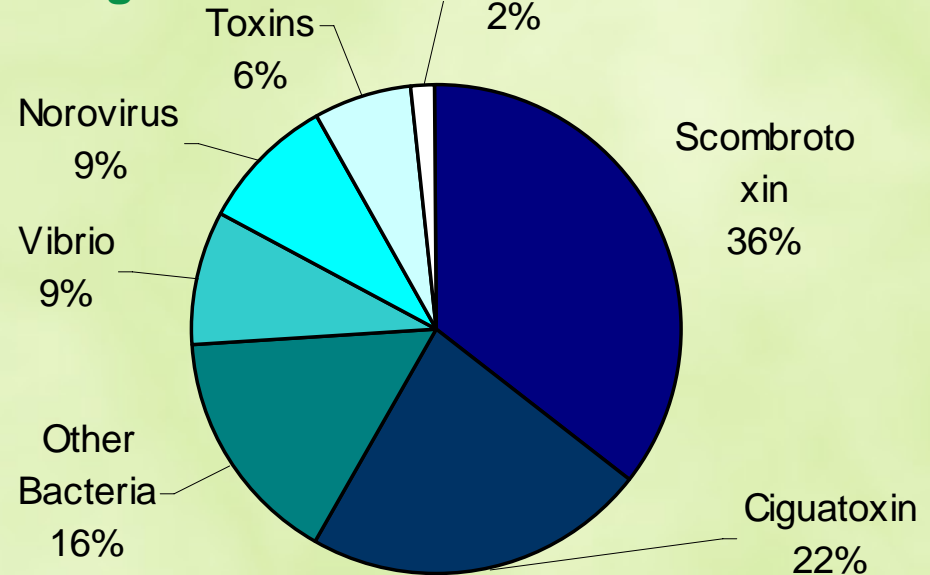


Pathogens in Produce Outbreaks 1990-2005

Etiology of FDA Regulated Foods – Produce and Seafood Outbreaks



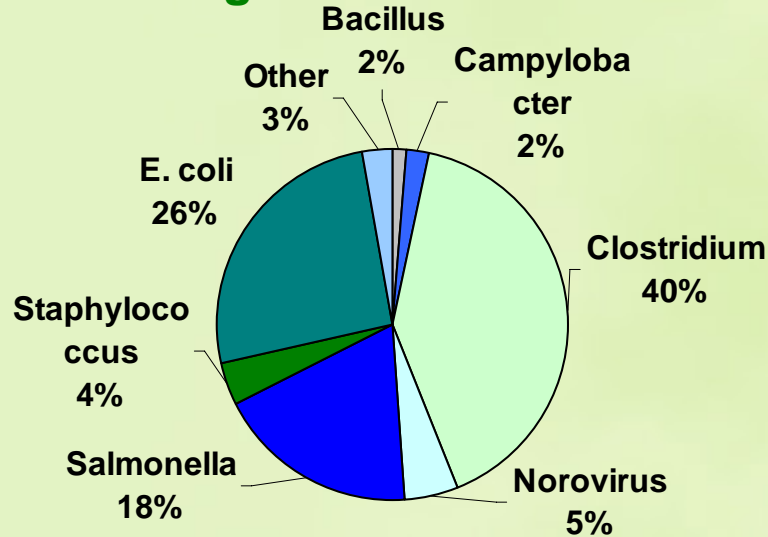
Pathogens in Seafood Outbreaks 1990-2005



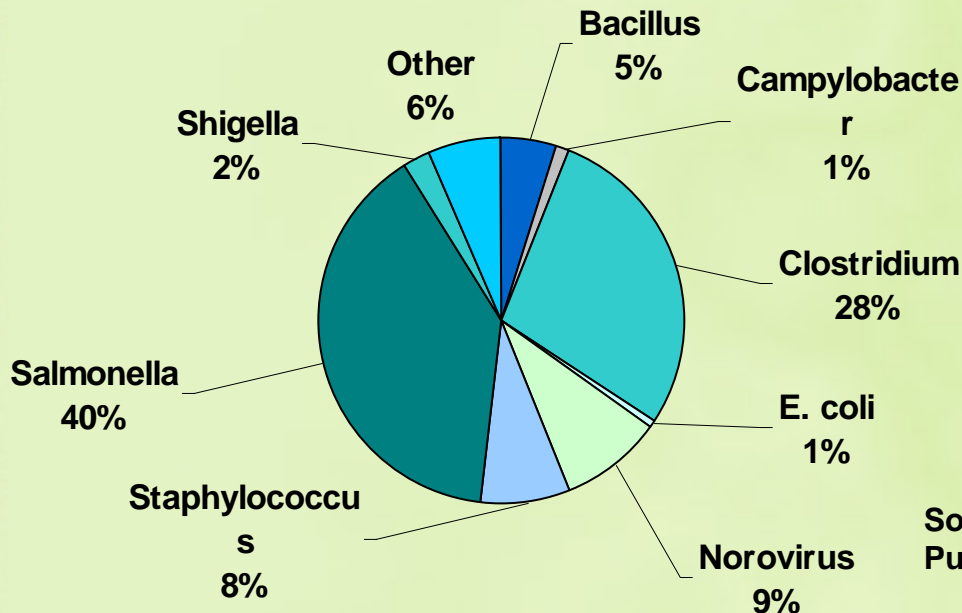
Source: *Outbreak Alert!* Center for Science in the Public Interest, 2006



Pathogens in Beef 1990-2005



Pathogens in Poultry 1990-2005

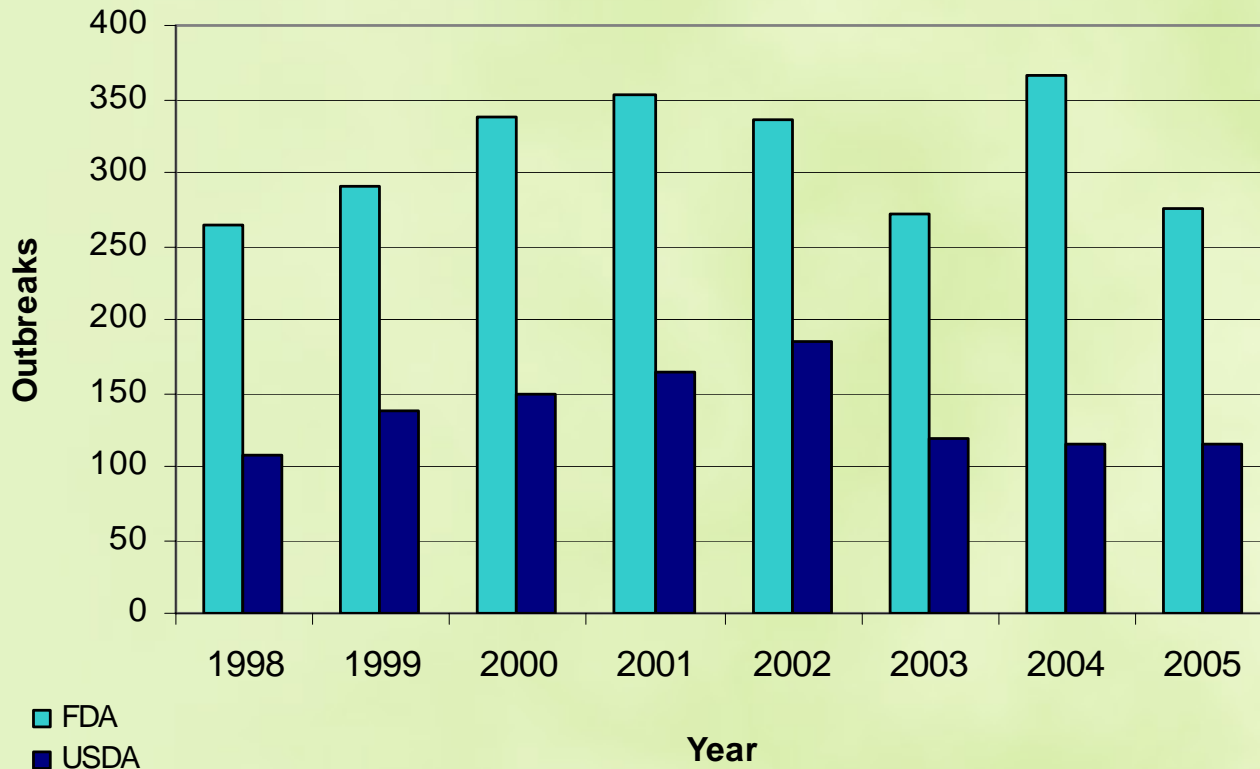


Etiology of USDA Regulated Foods – Beef and Poultry

Source: *Outbreak Alert!* Center for Science in the Public Interest, 2006



FDA vs. USDA – Foodborne Illness Outbreaks



Source: *Outbreak Alert!* Center for Science in the Public Interest, 2006

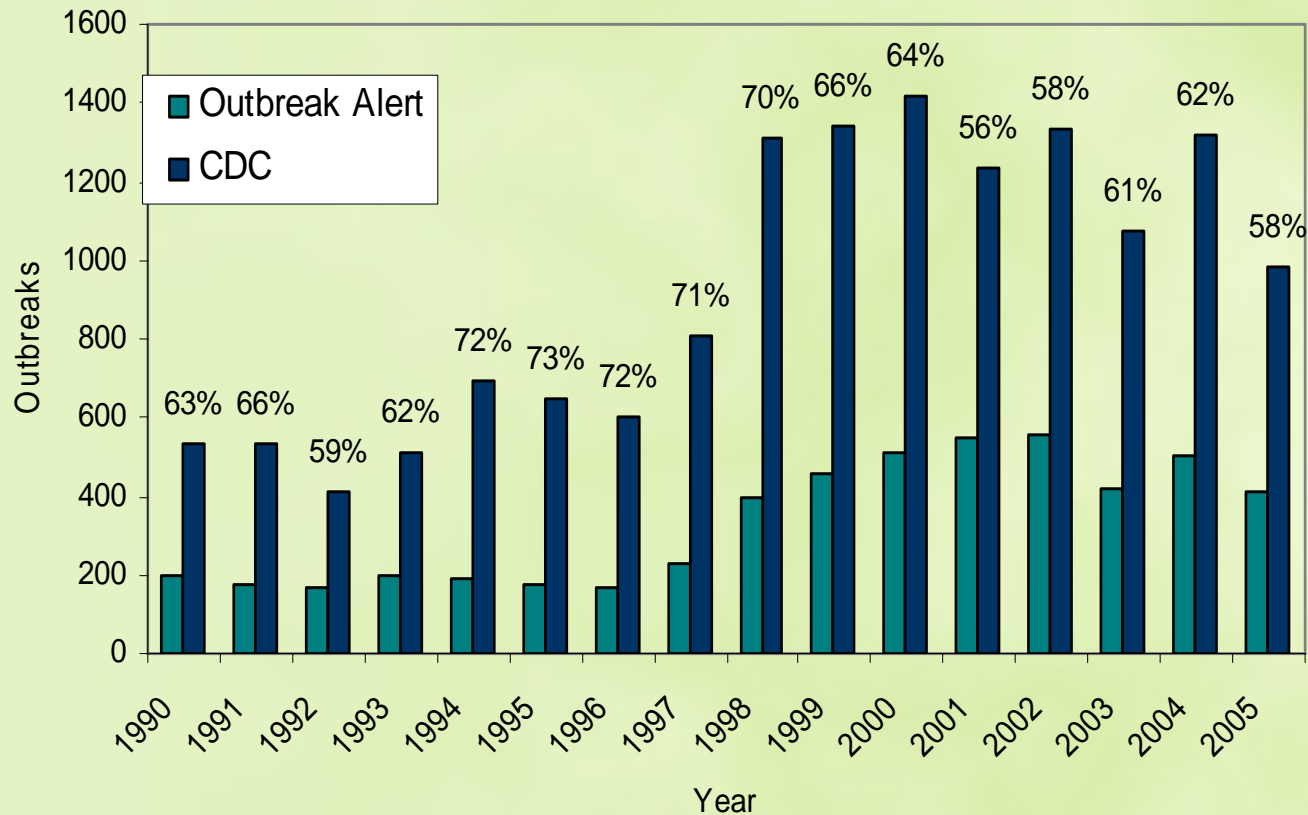


Limitations of CSPI's database

- Represents a small percentage of actual foodborne illnesses
- Represents less than half of reported foodborne outbreaks, others include unknown food or pathogen.
- Sporadic cases of foodborne illnesses are omitted, e.g. *Campylobacter* and *V. vulnificus* are underreported in the data.



Outbreaks With Unknown Food or Etiology Are the MAJORITY of Reported Outbreaks



Source: The Center for Science in the Public Interest and CDC

Available Online

The screenshot shows a web browser window titled "Outbreak Alert! Database - Windows Internet Explorer". The address bar contains the URL "http://www.cspinet.org/foodsafety/outbreak/pathogen.php". The page features the logo of the Center for Science in the Public Interest and the text "Outbreak Alert! DATABASE". A search bar is present with the text "Search all Outbreaks by Food, Pathogen or State:" and a "Search" button. Below the search bar, there are three dropdown menus labeled "Food (Definitions)", "Pathogen (Definitions)", and "State". The "Food" dropdown menu is open, showing a list of categories: Beef, Beverages, Both, Breads and Bakery, Dairy, Eggs, Game, Luncheon/Other Meats, Multi-ingredient, Pork, Poultry, Produce (with sub-items Fruits and Vegetables), and Seafood/Produce Dishes. A small text box at the bottom left of the page says "If you have" and a text box at the bottom right says "out the Outbreak Alert! Database, please email foodsafety@cspinet.org".

<http://www.cspinet.org/foodsafety>



Exciting News from Safe Food International:

SFI is launching a website containing the news contained in SFI's Regional Updates!
Please Visit:

<http://regionalnews.safefoodinternational.org/>

This website includes the following topics from each region:

- Food/Waterborne Illness Outbreaks
- Food Safety Studies
- Food Safety Policy Issues
- Animal/Plant Health Issues



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